MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2015/2016

TCN2141 – COMPUTER NETWORKS
(All sections / Groups)

8 MARCH 2016
2.30 p.m. – 4.30 p.m.
(2 Hours)

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INSTRUCTIONS TO STUDENTS

1. This Question paper consists of 5 pages with 7 Questions only
2. Attempt **SIX** out of **SEVEN** questions.
3. All questions carry equal marks and the distribution of the marks for each question is given.
4. Please print all your answers in the Answer Booklet provided.

QUESTION 1

a) Given a host IP address with CIDR as 175.15.128.5 /19. As the network administrator, find the following information?

    i.   What is the given current IP address subnet range?
    ii.   What is the subnet number for the 6th subnet?
    iii. What is the subnet broadcast address for 4th subnet?
    iv. What are assignable addresses for the 7th subnet?
    v.   How many usable hosts per subnet?

b) Describe THREE ways to measure network layer performance.

c) Explain the two-way and three-way handshake mechanisms.

$$[5 + 3 + 2 = 10 \text{ Marks}]$$

QUESTION 2

a) Consider sending a 4700-byte datagram into a link that has a MTU of 1100 bytes. Suppose the original datagram is stamped with the identification number 345516 as shown in table below (Original IP datagram). How many fragments are generated? What are the values in the various fields in the IP datagram(s) generated related to fragmentation? Use IP fragments table below to give your answer.

Original IP Datagram					
Sequence	Identifier	Total Length	DF	MF	Offset
AB	345516	4700	0	0	0

| IP Fragments (Ethernet)							
Sequence	Identifier	Total Length	DF	MF	Offset	First byte	Last byte

Continued...

b) What is the piece of information in a packet upon which the forwarding decision is made in each of the following switching approaches?
   i.   datagram approach
   ii. virtual-circuit approach

c) What type of domains are created by a router? How it is different than the one created by switch?

[5 + 1 + 4 = 10 Marks]

QUESTION 3

a) Use Dijkstra's algorithm to find the cost of the cheapest path between **A** and **H** in the following weighted graph. Describe at each iteration the function L and set S. Give your answer by drawing a table as shown below.

Figure Question 3a: Dijkstra's Algorithm
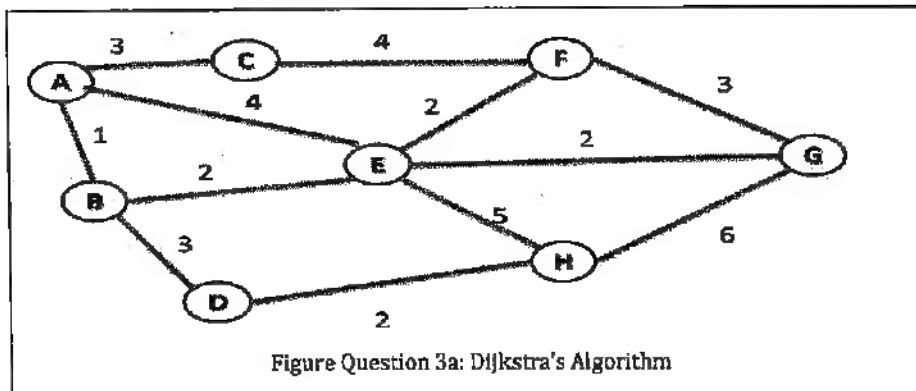
S	L(A)	L(B)	L(C)	L(D)	L(E)	L(F)	L(G)	L(H)
Cost from A to H								

Continued...

b) Give two example of computer applications for which connection-oriented service is appropriate. Give two examples for which connectionless service is best.

c) Are there any circumstances when connection-oriented service will (or at least should) deliver packets out of order? Briefly explain.

d) It is observed that *"datagram subnets route each packet as a separate unit, independent of all others. Virtual-circuit subnets do not have to do this, since each data packet follows a predetermined route"*. Does this observation mean that virtual-circuit subnets do not need the capability to route isolated packets from an arbitrary source to an arbitrary destination? Briefly explain.

[5 + 2 + 2+ 1 = 10 Marks]

QUESTION 4

a) Explain how CIDR supports route aggregation and supernetting.

b) Expand fully the following IPv6 addresses into 128 binary.

   i.   ::F53:6382:AB00:67DB:BD27:7342
   ii.   2819:8F::35:CB2:C271
   iii. 140:1ABC:419A:E000::

c) Describe what a VPN is and how it benefits by using IPSec?

[3 + 3 + 4 = 10 Marks]

QUESTION 5

a) Calculate IP header checksum if an IP header is given as below
45000028557040008006000000A0058143A1B5613

b) Validated the above (a) checksum output at receiver's side and show that the IP header has no error.

c) Describe PIM sparse mode.

[4 + 2 + 4 = 10 Marks]

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QUESTION 6

a) What is the use of proxy ARP?

b) What is gratuitous ARP?

c) How is the TTL field used to prevent indefinite looping of IP datagrams?

d) What are the FOUR different types of criteria that can be specified using the TOS field?

e) What are the differences between message confidentiality and message integrity? Can you have one without the other? Justify your answer.

[2+2+2+2+2 = 10 Marks]

QUESTION 7

a) What's the difference between client/server and peer-to-peer networks?

b) Briefly describe the problems associated with RIP?

c) Briefly describe Split Horizon Technique.

d) What is the Poison reverse technique?

[2+4+2+2 = 10 Marks]

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